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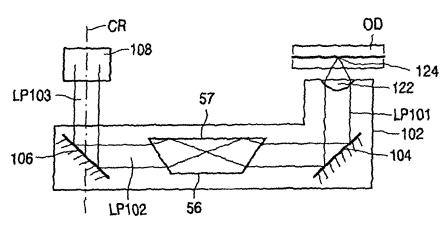
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(54) Title: OPTICAL SCANNING DEVICE



(57) Abstract: Αn optical scanning device for scanning an information layer of an optical record carrier and including a rotary aim (2; 102; 202; 302; 402; 502) which is arranged to swing about a rotation axis (CR) to alter an angular position of the rotary arm about the rotation axis; a detector arrangement (10) arranged separate from the rotary arm (2; 102; 202; 302; 402; 502) for detecting a radiation beam spot, the radiation beam spot (40; 140; 240; 340; 440; 540) having an angular disposition; a first reflective surface (4; 104; 204; 304;

404; 504) attached to the rotary arm (2; 102; 202; 302; 402; 502); a second reflective surface (6; 106; 206; 306; 406; 506) attached to the rotary arm (2; 102; 302; 402; 502); a first light path (LP 1; LP 1 O 1; LP201; LP301; LP401; LP501) running from a location on the record carrier to said first reflective surface; a second light path (LP2; LP102; LP202; LP302; LP402; LP502) running from said first reflective surface to said second reflective surface; a third light path (LP3; LP103; LP203; LP303; LP403; LP503) running from said second reflective surface to said detector arrangement (10). The rotary arm includes at least one optical inversion element (52; 54; 56; 58; 64; 66) arranged such that a dependence between variation of the angular disposition of the radiation beam spot and variation of the angular position of the rotary arm is reduced.



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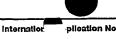
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT								
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.						
A	PATENT ABSTRACTS OF JAPAN vol. 014, no. 477 (P-1118), 17 October 1990 (1990-10-17) & JP 02 192043 A (FUJITSU LTD), 27 July 1990 (1990-07-27) abstract	1-11						
A	PATENT ABSTRACTS OF JAPAN vol. 2002, no. 04, 4 August 2002 (2002-08-04) & JP 2001 357549 A (FUJITSU LTD), 26 December 2001 (2001-12-26) cited in the application abstract	111						

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INTERNATIONAL SEARCH REPORT

Internation pplication No PCT/IB 03/02974

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
JP 11016195	Α	22-01-1999	NONE		<u> </u>
US 2001007547	A1	12-07-2001	JP JP JP	11134680 A 11134683 A 11134684 A	21-05-1999 21-05-1999 21-05-1999
US 6215755	B1	10-04-2001	NONE		
JP 02192043	Α	27-07-1990	JP	2870775 B2	17-03-1999
JP 2001357549	Α	26-12-2001	NONE		